

REMARKS

This Response addresses the issues raised by Examiner in the Office Action mailed June 18, 2004. Initially, Applicants would like to thank the Examiner for the careful consideration given this case. The Claims were 12, 14, 16, 17 and 19-27. Claims 12, 14, 19 and 23 have been amended. No new matter has been added by the amendments. Thus, Claims 12, 14, 16, 17 and 19-27 are pending in this case all to more clearly and distinctly claim Applicants' invention. Applicants respectfully request entry of the amendments as they place the application in condition for allowance or in better condition for possible appeal.

Claim Objections

The Examiner objects to Claims 23-27 because the phrase "the inner sides and outer sides of the light integrator form a cavity" recited in claim 23 is confusing and indefinite. The Examiner asserts that the "inner sides" and the "outer sides" lack proper antecedent basis from the earlier part of the claims. Further, the Examiner states that it is not clear what are the inner sides and outer sides and how they form the cavity.

Applicants have amended independent Claim 23 to include when the parts of the light integrator are assembled they form a cavity. The terms "inner sides" and "outer sides" no longer appear in Claim 23. Thus, this objection is rendered moot. Withdrawal of the present objection is respectfully requested.

Rejection Based On Iseda In View Of Farmiga And Takahashi Under 35 U.S.C. § 103(a)

The Examiner rejects Claims 12, 14, 16-17, 19-20, 23-25 under 35 U.S.C. § 103 (a) as being unpatentable over Japanese Patent No. JP 36305802 A to Iseda et al. in view of U.S. Patent No. 5,828,505 to Farmiga et al and U.S. Patent No. 5,735,793 to Takahashi et al. Applicants respectfully traverse this rejection.

The Examiner acknowledges that Iseda does not teach that the inner surface of the spacers are coated with reflective coatings. However, the Examiner asserts that such a

feature is either inherently met or an obvious modification to one skilled in the art since it is standard practice in the art to make all inner surfaces of the light guiding cavity with reflective coatings, such as shown by the teachings of Farmiga. The Examiner then concedes that Iseda and Farmiga do not teach having the cavity covered with shrink tubing. The Examiner concludes that it would have been obvious to one skilled in the art to apply the teachings of Takahashi to use the shrink tube as a fastening means to fasten the glass sheet with spacers of the light guiding device of Iseda for the benefit of providing a fastening means with no filth-collecting gaps formed in the interior of the joint of the elements and the cavity, which implicitly makes the light guiding device have a light-proof property. Applicants respectfully disagree.

To establish obviousness of a claimed invention, all claim elements must be disclosed, taught or suggested by the prior art. We agree with the Examiner that Iseda does not teach that the inner surface of the spacers are coated with reflective coatings or having the cavity covered with shrink tubing. We also agree that Farmiga does not mention covering the cavity of the light guiding device with shrink tubing.

Iseda teaches a light guiding device forming a cavity by two I-shaped side parts with coated inner surfaces and two spacers being T-shaped, Iseda does not disclose the feature that these four parts are held together by at least one piece of shrink tubing. In addition, Iseda does not teach that the inner surface of the spacers are coated with reflective coatings. Thus, Iseda does not teach the light integrator of the present invention.

In regards to Farmiga, Farmiga discloses a light guiding device that can be mechanically clamped together or be cemented together with small bead of cement. See Col. 2 lines 20-23. Farmiga does not even mention using shrink tubing to hold the light guiding device together. For that reason, Farmiga does not teach the light integrator of the present invention.

In regards to Takahashi, Takahashi discloses an endoscope not an optical guiding device. Takahashi discloses an endoscope having a suction tube to suck liquids or tissue parts. See Col. 5 and 6, lines 25-30 and lines 9-15, respectively. Since liquids and tissue parts would alter the optical properties of a optical guiding device in an unpredictable matter,

Takahashi does not teach to form an optical pipe with a cavity within having coated inner surfaces. Further, Takahashi discloses a flexible tube that is slipped over the rigid pipe and is pressed against the rigid pipe by a heat shrinking tube. Thus, a cavity is already formed by the tube or the pipe in Takahashi and the heat shrinking tube is only used to fix the longitudinal position of the tube with respect to the pipe. Moreover, a person of ordinary skill in the art knows that an uniform internal reflective coating with sufficient mirror quality in the field of light integrators on the inner side of the pipe cannot be realized. See Specification on page 3, lines 25-29. Even if the flexible pipe in Takahashi were provided with a reflective coating, the reflective coating would crack and crumble when the flexible tube is slipped over the rigid pipe. As a result, Takahashi does not teach forming an optical pipe with a cavity within having reflective coated inner surfaces, where the parts are held together by at least one piece of shrink tubing such that the parts contact one another to be practically light-proof. Thus, Takahashi does not teach the light integrator of the present invention.

In contrast, the present invention claims a light integrator for homogenization of a light bundle entering an input surface and exiting from an output surface where the light integrator includes a cavity with an inner reflective coating for conducting light. The present invention also discloses that the light integrator is composed of at least two parts whose surfaces, which face inward after assembly, are provided with the inner reflective coating prior to assembly where one part is provided with a projection engaging in a cutout of the other part after assembly. The parts of the light integrator of the present invention are also held together by a least one piece of shrink tubing such that the parts contact one another to be practically light-proof. Since the parts of the light integrator of the present invention do not already form a cavity, the reflective coating can be applied before the assembly of parts and only by combining at least two parts to form the cavity where this position of the part are fixed by the shrink tubing.

Accordingly, Iseda does not teach that the inner surface of the spacers are coated with reflective coatings. Also, Iseda and Farmiga do not teach covering the cavity of the light guiding device with shrink tubing. Further, Takahashi does not disclose this deficiency of

Iseda or Farmiga. Thus, the Applicants believe that the present invention is not obvious over the teaching of Iseda in view of Farmiga and Takahashi since Iseda, Farmiga and/or Takahashi does not teach, disclose or suggest the present claims. Moreover, one skilled in the art would find nothing in Iseda, Farmiga or Takahashi alone or in combination that would disclose, teach or suggest the claimed invention or any reason for making it. Further, there is no motivation to combine the references in such a way to get the claimed invention. Therefore, an obvious rejection under 35 U.S.C. §103 (a) is improper.

Rejection Based On Iseda, Farmiga And Takahashi Further In View of Levis Under 35 U.S.C. § 103 (a)

The Examiner rejects Claims 21-22 and 26-27 under 35 U.S.C. § 103 (a) as being unpatentable over Japanese Patent No. JP 36305802 A to Iseda et al., U.S. Patent No. 5,828,505 to Farmiga et al and U.S. Patent No. 5,735,793 to Takahashi et al. as applied to claims 14 and 23 above, and further in view of U.S. Patent No. 5,902,033 to Levis et al. Applicants respectfully traverse this rejection.

The Examiner asserts that the light guiding device as taught by Iseda in combination with the teaching so Farmiga and Takahashi as described for claim 14 and 23 above have met all of the limitations of the claims. The Examiner then asserts that these reference do not teach using the beam shaper construction to illuminate a matrix of image display elements. The Examiner looks to Levis to cure this deficiency. The Examiner states that it would have been obvious to one skilled in the art to apply the teaching of Levis to apply the light guiding device of Iseda to illuminate a light modulator panel for the benefit of providing an image projection device. The Examiner then concludes that although these reference do not teach explicitly that the light modulator panel is a matrix of tilted mirrors, such an arrangement is known in the art as a deformable micromirror device, which is a standard image display device in the art, such modification would therefore have been an obvious matter of design choice to one skilled in the art. Applicants respectfully disagree.

To establish obviousness of a claimed invention, all claim elements must be disclosed, taught or suggested by the prior art. As stated above, Iseda does not teach that the inner surface of the spacers are coated with reflective coatings or having the cavity covered with shrink tubing. Also, Farmiga does not mention covering the cavity of the light guiding device with shrink tubing. In addition, Takahashi does not teach forming an optical pipe with a cavity within having reflective coated inner surfaces, where the parts are held together by at least one piece of shrink tubing such that the parts contact one another to be practically light-proof.

Levis teaches a projector system that includes a light pipe integrator that is hollow, formed from sheet metal and has an internal cold mirror coating which reflect visible light. See Abstract. Levis discloses the projector system is a LCD (Liquid Crystal Display) system. We agree with the Examiner that Levis does not explicitly teach that the light modulator panel is a matrix of tilted mirrors.

In contrast, the present invention claims a light integrator for homogenization of a light bundle entering an input surface and exiting from an output surface where the light integrator includes a cavity with an inner reflective coating for conducting light. The present invention also discloses that the light integrator is composed of at least two parts whose surfaces, which face inward after assembly, are provided with the inner reflective coating prior to assembly where one part is provided with a projection engaging in a cutout of the other part after assembly. The parts of the light integrator of the present invention are also held together by a least one piece of shrink tubing such that the parts contact one another to be practically light-proof.

As a result, Iseda, Farmiga and Takahashi do not teach that the inner surface of the spacers are coated with reflective coatings and that covering the cavity of the light guiding device with shrink tubing. In addition, Levis does not cure this deficiency of Iseda, Farmiga and Takahashi. Further, Levis does not teach that the light modulator panel is a matrix of tilted mirrors. Thus, the Applicants believe that the present invention is not obvious over the teaching of Iseda, Farmiga and Takahashi further in view of Levis since Iseda, Farmiga,

Takahashi and/or Levis does not teach, disclose or suggest the present claims. Moreover, one skilled in the art would find nothing in Iseda, Farmiga, Takahashi, or Levis alone or in combination that would disclose, teach or suggest the claimed invention or any reason for making it. Further, there is no motivation to combine the references in such a way to get the claimed invention. Therefore, an obvious rejection under 35 U.S.C. §103 (a) is improper.

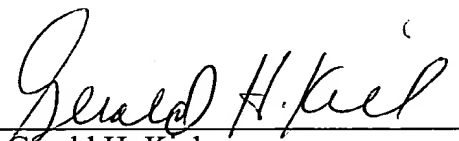
Rejection Based On Obviousness-Type Double Patenting

The Examiner rejects Claims 12, 14, 16-17 and 19-27 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 1-8 of U.S. Patent No. 6,625,380. Applicants are filing herewith a Terminal Disclaimer. It is respectfully submitted that this overcomes the present rejection of the Examiner. Reconsideration and withdrawal of this rejection is respectfully requested.

In view of the remarks presented herein, it is respectfully submitted that the present application is in condition for final allowance and notice to such effect is requested. If the Examiner believes that additional issues need to be resolved before this application can be passed to issue, the undersigned invites the Examiner to contact him at the telephone number provided below.

Respectfully submitted,

Dated: August 9, 2004

By 
Gerald H. Kiel
Reg. No. 25,116

REED SMITH LLP

599 Lexington Avenue
29th Floor
New York, NY 10022-7650
(212) 521-5400
Attorney for Applicant

GHK:ST/vh